

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Previously Presented) A method for fabrication of a semiconductor device on substrate, the semiconductor device having a plurality of layers, the method including:

(a) applying a seed layer of a thermally conductive metal to a first surface of the semiconductor device;

(b) electroplating a relatively thick layer of the thermally conductive metal on the seed layer, the thermally conductive metal of sufficient thickness to provide a heat sink; and

(c) removing the substrate.

2. (Original) A method as claimed in claim 1, wherein the first surface is coated with an adhesion layer prior to application of the seed layer.

3. (Previously Presented) A method as claimed in claim 1, wherein the seed layer is patterned with photoresist patterns before the electroplating step (b), and the electroplating of the relatively thick layer is between the photoresist patterns.

4. (Cancelled)

5. (Previously Presented) A method as claimed in claim 1, wherein between steps (b) and (c) there is performed the additional step of annealing the layers to improve adhesion, and the photoresist patterns are of a height in the range 15 to 500 micrometers, a thickness in the range 3 to 500 micrometers, and a spacing in the range of 200 to 2,000 microns.

6-8. (Cancelled)

9. (Previously Presented) A method as claimed in claim 1, wherein the seed layer is electroplated in step (b) without patterning, patterning being performed subsequently by photoresist patterning and then wet etching.

10. (Cancelled)

11. (Previously Presented) A method as claimed in claim [[9]] 3, wherein patterning is by laser beam micro-machining of the relatively thick layer.

12. (Previously Presented) A method as claimed in claim 3, wherein the relatively thick layer is of a height no greater [[that]] than the photoresist height.

13. (Previously Presented) A method as claimed in claim 3, wherein the relatively thick layer of thermally conductive metal is electroplated to a height greater than the photoresist and is subsequently thinned, thinning being by polishing or wet etching.

14. (Cancelled)

15. (Previously Presented) A method as claimed in claim 1, wherein after step (c) there is included an extra step of forming on a second surface of the semiconductor device a second ohmic contact layer, the second ohmic contact layer being selected from the group consisting of: opaque, transparent, and semi-transparent, the second ohmic contact layer being one of blank and patterned, bonding pads being formed on the second ohmic contact layer.

16-17. (Cancelled)

18. (Previously Presented) A method as claimed in claim 1, wherein after step (c) ohmic contact formation and subsequent process steps are carried out, the subsequent process steps including deposition of wire bond pads.

19. (Previously Presented) A method as claimed in claim 15, wherein the exposed second surface is cleaned and etched before the ohmic contact layer is deposited, the second ohmic contact layer not covering the whole area of the second surface.

20. (Cancelled)

21. (Previously Presented) A method as claimed in claim 15, wherein after forming the second ohmic contact layer there is included testing of the

semiconductor devices on the epitaxial layers, and separating the layers into individual devices.

22. (Cancelled)

23. (Previously Presented) A method as claimed in claim 1, wherein the semiconductor devices are fabricated without one or more selected from the group consisting of: lapping, polishing and dicing.

24. (Previously Presented) A method as claimed in claim 1, wherein the semiconductor device comprises a plurality of epitaxial layers, a first ohmic contact layer being on a first surface of the epitaxial layers remote from the substrate; the first ohmic contact layers being on p-type layers of the epitaxial layers.

25. (Previously Presented) A method as claimed in claim 24, wherein the second ohmic contact layer is formed on n-type layers of the expitaxial layers.

26. (Previously Presented) A method as claimed in claim 1, wherein after step (c), dielectric films are deposited on the epitaxial layers and openings are cut in the dielectric films and second ohmic contact layer and bond pads deposited on the epitaxial layers.

27. (Previously Presented) A method as claimed in claim 24, wherein after step (c), electroplating of a thermally conductive metal on the semiconductor device is performed.

28. (Previously Presented) A method as claimed in claim 27, wherein the thermally conductive metal comprises copper and the epitaxial layers comprise multiple GaN-related layers.

29. (Withdrawn) A semiconductor device comprising epitaxial layers, first ohmic contact layers on a first surface of the epitaxial layers, a relatively thick layer of a thermally conductive metal on the first ohmic contact layer to form a heat sink, and a second ohmic contact layer on a second surface of the epitaxial layers, an adhesive layer on the first ohmic contact layer between the first ohmic contact layer and the relatively thick layer[;], the relatively thick layer being applied by electroplating.

30. (Withdrawn) A semiconductor device as claimed in claim 29, wherein there is a seed layer of the thermally conductive metal, applied to the adhesive layer.

31. (Withdrawn) A semiconductor device as claimed in claim 29, wherein the relatively thick layer is at least 50 micrometers thick, and the second ohmic contact layer is a thin layer in the range of from 3 to 500 nanometers.

32. (Cancelled)

33. (Withdrawn) A semiconductor device as claimed in claim 29, wherein the second ohmic contact layer is selected from the group consisting of: opaque, transparent, and semi-transparent, and includes bonding pads.

34. (Cancelled)

35. (Withdrawn) A semiconductor device as claimed in claim 29, wherein the thermally conductive metal is copper and the epitaxial layers comprise multiple GaN-related epitaxial layers.

36. (Withdrawn) A semiconductor device as claimed in claim 29, wherein the semiconductor device is selected from the group consisting of: a light emitting device, and a transistor device.

37. (Withdrawn) A semiconductor device comprising epitaxial layers, a first ohmic contact layer on a first surface of the epitaxial layers, an adhesive layer on the first ohmic contact layer, and a seed layer of a thermally conductive metal on the adhesive layer.

38. (Withdrawn) A semiconductor device as claimed in claim 37, further comprising a relatively thick layer of the thermally conductive metal on the seed layer, the relatively thick layer acting as a heat sink, and a second ohmic contact layer on a second surface of the epitaxial layers, the second ohmic contact layer being a thin layer in the range of from 3 to 500 nanometers.

39. (Cancelled)

40. (Withdrawn) A semiconductor device as claimed in claim 37, wherein the second ohmic contact layer comprises bonding pads and is selected from the group consisting of: opaque, transparent, and semi-transparent.

41. (Withdrawn) A semiconductor device as claimed in claim 37, wherein the thermally conductive metal comprises copper, and the epitaxial layers comprise GaN-related layers.

42. (Withdrawn) A method of fabrication of a semiconductor device, the method including:

- (a) on a substrate with a plurality of epitaxial layers comprising multiple GaN-related epitaxial layers, forming a first ohmic contact layer on a first surface of the epitaxial layers;

- (b) removing the substrate from the epitaxial layers; and

- (c) forming a second ohmic contact layer on a second surface of the epitaxial layers, the second ohmic contact layer having bonding pads formed thereon.

43. (Withdrawn) A method as claimed in claim 42, wherein the second ohmic contact layer is selected from the group consisting of: opaque, transparent, and semi-transparent and is one of: blank, and patterned.

44. (Cancelled)

45. (Withdrawn) A semiconductor device fabricated by the method of claim 42.

46. (Withdrawn) A semiconductor device as claimed in claim 45, wherein the semiconductor device is one of: a light emitting device, and a transistor device.

47. (Previously Presented) A method for fabrication of a semiconductor device on a substrate, the semiconductor device having a plurality of layers with a device layer[[;]], the method including:

(a) electroplating a layer of a thermally conductive material onto a surface of the semiconductor device remote from the substrate and close to the device layer; and

(b) removing the substrate.

48. (Previously presented) A method as claimed in claim 47, wherein the semiconductor device is a silicon-based device.

49. (Withdrawn) A method for fabrication of a light emitting device on a substrate, the light emitting device having a plurality of layers with an active layer, the method including:

(a) electroplating a layer of a thermally conductive material onto a surface of the semiconductor device remote from the substrate and close to the active layer; and

(b) removing the substrate.

50. (Withdrawn) A method as claimed in claim 49, wherein the thermally conductive layer is as a heat sink.

51. (Withdrawn) A method as claimed in claim 49, wherein the thermally conductive layer is of a thickness in the range of from 3 microns to 300 microns.

52. (Withdrawn) A method as claimed in claim 49, wherein the thermally conductive layer is of a thickness of from 50 to 200 microns.

53. (Cancelled)